

REMARKS

In the Office Action mailed 5 November 2003, the Examiner objected to the Declaration; rejected claims 2, 3, and 42 under the second paragraph of 35 USC §112; rejected claims 1, 6, 7, 14-18, 21-23, 26, 27, and 34-42 under 35 USC §103(a). The undersigned asks the Examiner to reconsider and withdraw these rejections and objections. A separate petition for a one-month extension of time accompanies this amendment.

I. Objection to the Declaration

The Examiner objects to the declaration as defective under 37 CFR §1.52(c) because it includes non-initialed and/or non-dated alterations. The undersigned assumes that the Examiner is referring to Trung T. Doan's correction of his city of residence immediately adjacent his signature and date. 37 CFR §1.52(c) states that any "alteration of the application papers filed **must** be made before the signing of any accompanying oath or declaration pursuant to §1.63 referring to those application papers and **should** be dated and initialed or signed by the applicant." First, the undersigned notes that this rule relates to alterations in papers referred to in the declaration, not the declaration itself. Second, Mr. Doan's signature and date next to his correction would seem to meet the requirements of the rule. Finally, as suggested by the added emphasis in the quoted passage, it is mandatory ("must") that any changes in papers accompanying a declaration be made before signing the declaration, but initialing and dating those changes is merely permissive ("should").

Hence, the undersigned does not believe the current declaration is fatally defective. To expedite prosecution, though, the undersigned has enclosed an application data sheet (ADS) in compliance with 37 CFR §1.76. MPEP §602.01 states:

[I]n some cases, a deficiency in the oath or declaration can be corrected by a supplemental paper such as an application data sheet (see 37 CFR 1.76 and MPEP § 601.05) and a new oath or declaration is not necessary. See 37 CFR 1.63(c)(1) and (c)(2).

37 CFR §1.63(c)(1), cited at the end of this passage, specifically indicates that the inventors' mailing address and residence can be included in an ADS instead of an oath or declaration. Accordingly, the undersigned trusts that the enclosed ADS will satisfy the Office's needs. If the Examiner has any further concerns or would like to discuss this issue, the undersigned would welcome a telephone call at the number listed below.

II. Amendments

The present amendment amends claims 2, 3, and 42. These non-narrowing, cosmetic changes are believed to overcome the Examiner's concerns under 35 USC §112, second paragraph.

III. Rejections under 35 U.S.C. § 103

The Examiner rejected claims 1, 6, 7, 14-18, 21-23, 26, 27, and 34-42 under 35 USC §103(a) as obvious over US Patent 5,993,637 (Hisamatsu). The undersigned respectfully submits that each of these rejections is based on a mischaracterization of HH and that each of the rejected claims is patentably over HH.

A. The Applied Art

HH, the sole reference applied by the Examiner, which suggests a multi-layer electrode structure (Figures 1A-D) for use in electrolytic etching. Figure 2 of HH illustrates a single power supply 205 that has one pole connected to a first electrode (101 in Figures 1A-D) of an electrode structure 100 and a second pole connected to both an etching object 202 and the second electrodes (103 in Figures 1A-D) of the electrode structure 100. The shape of the first electrode corresponds to an intended etching pattern, i.e., the shape of the material to be removed from the etching object 202. (Column 4, lines 3-13.) In use, the power supply 205 maintains the second electrodes 103 and the etching object 202 at the same potential so that the space between the second electrodes will define the width of the material to be etched. (See, e.g., column 7, line 65 – column 8, line 64.)

At column 4, lines 43-49, HH states that

In the present invention, a current flowing a gap between the electrode (counter electrode) [*electrode 101*] and the etching object

[202] (working electrode) may preferably comprise a direct current (DC), a pulse current, **or** an alternating current (AC). Depending on the shape and size of the etching region required and the patterning accuracy required, **the** kind of an applied current may appropriately be selected.

(Emphasis and reference numbers added.) A switch 206 between the power supply 205 and the first electrode 101 is operated by a timer 207 to control the length of time that the etching object 202 is subjected to the current from the power supply.

B. Claims 1, 6, and 7

Claim 1 calls for a workpiece holder, a workpiece electrode, first and second remote electrodes, a mechanical medium, an AC power supply, a DC power supply, and a switching assembly. The switching assembly is configured to selectively couple the AC power supply and/or the DC power supply to the workpiece electrode, the first remote electrode, and/or the second remote electrode. In rejecting this claim, the Examiner contends that HH

teaches an AC power supply **and** DC power supply all of which (including the workpiece) are interconnected by a switching mechanism (col. 6, lines 43-56). The arrangement shown appears to be 'enabled to selectively couple the AC and/or DC power supply' to the object (workpiece/microelectronic element). Col. 4, lines 44-50 and col. 6, lines 12-56.

(Emphasis added.) The undersigned disagrees with this characterization of HH on at least two grounds. First, HH notes in the passage quoted above that "**the** kind of an applied current" delivered by the power supply 205 may be DC, pulse current, **or** AC. Hence, HH contemplates that the user will select a single kind of current suitable to the particular etching pattern being used. This contradicts the Examiner's conclusion that HH teaches using an AC power supply **and** a DC power supply.

Second, the Examiner states that HH's system is enabled to selectively couple the AC and/or DC power supply to the workpiece. The passages cited in support of this assertion, however, merely encompass the previously quoted passage of HH and a

general discussion of the elements of Figure 2. Although this general discussion states that the current can be “turned on and shut off ... by using the switching mechanism 206 and the timer 207,” the undersigned sees not even a hint that the switch 206 is intended to do anything but make or break a single electrical circuit. If the undersigned has overlooked some aspect of HH that teaches a switch that selectively couples an AC power supply and/or a DC power supply to a workpiece electrode, a first remote electrode, and/or a second remote electrode, he asks that the Examiner point out the relevant passage(s). Otherwise, the asserted reading of HH is founded on speculation and hindsight, not the plain meaning of HH.

In sum, HH suggests neither using an AC power supply **and** a DC power supply nor a switch configured to selectively couple the AC power supply and/or the DC power supply to the electrodes identified in claim 1. The Examiner has not articulated any motivation for one of ordinary skill in the art to modify HH to arrive at the claimed invention. Hence, the present rejection of claim 1 as obvious over HH cannot stand. Claims 6 and 7 depend from claim 1 and are patentable at least by virtue of their dependence on claim 1.

C. Claims 14-18

Aspects of independent claims 14 and 21 are analogous to aspects of claim 1 discussed above. By analogy to the preceding discussion, therefore, claim 14 and dependent claims 15-18 are patentable over HH, as are claim 21 and dependent claims 22, 23, 26, and 27.

D. Claim 34

Claim 34 defines an apparatus for electrochemical-mechanical processing of microelectronic workpieces that includes a workpiece holder, a workpiece electrode, first and second remote electrodes, a mechanical medium, both an AC power supply and a DC power supply, a switching assembly, and a controller including a computer operable medium. The computer operable medium contains instructions to operate the switching assembly to (a) couple the workpiece electrode and at least one of the first and second remote electrodes to the DC power supply, and/or (b) couple the first and second remote electrodes to the AC power supply.

As noted above in the discussion of claim 1, the Examiner's characterization of HH as teaching an AC power supply **and** a DC power supply is inaccurate. The Examiner does not specifically allege that HH suggests a controller such as that defined in claim 34 and the undersigned does not see such a suggestion in the reference. If the Examiner believes HH does teach such a controller, the undersigned asks that the Examiner point out the relevant passages of the reference. Otherwise, claim 34 is patentable over HH at least on these bases.

E. Claim 35

The apparatus for electrochemical-mechanical processing of microelectronic workpieces of claim 35 includes a workpiece holder, a workpiece electrode, first and second remote electrodes, a mechanical medium, both an AC power supply and a DC power supply, and a switching assembly. The switching assembly is configured to a) selectively couple the workpiece electrode and at least one of the first and/or second remote electrodes to the DC power supply, and b) selectively couple at least the first and second remote electrodes to the AC power supply. As noted above, HH does not suggest using both an AC and a DC power supply. Neither does HH suggest a switching assembly that can achieve the specified connections between a workpiece electrode and first and second remote electrodes. Consequently, the undersigned respectfully submits that claim 35 is patentable over HH.

F. Claims 36 and 37

Aspects of independent claims 36 and 37 are analogous to aspects of claim 1 discussed above. By analogy to the preceding discussion of claim 1, therefore, claims 36 and 37 are patentable over HH.

G. Claim 38

Claim 38 recites a method that includes contacting a processing side of a microelectronic workpiece with an electrolytic solution; applying direct electrical current to a workpiece electrode and a first remote electrode; applying an alternating current to the first remote electrode and a second remote electrode; and contacting the processing side of the workpiece with a mechanical medium at least while applying the alternating current to the first and second remote electrodes.

The Examiner does not appear to specifically address this method (or that of at least claims 39-41) in the present Office Action. Although the undersigned has not thoroughly reviewed the entirety of the HH reference, he is unaware of any suggestion in HH that a mechanical medium contact a workpiece. The Examiner does characterize the wiping means of Figures 8A-8D as a "mechanical medium," but the discussion of these figures at column 10, line 60 – column 11, line 14 makes it clear that the wiping means is designed to move along the surface of the electrode structure 100 to dislodge bubbles. There is no suggestion that this wiping means would contact the transparent electroconductive film (see, e.g., the last two lines of column 4 and the first line of column 5) being etched. To the contrary, such direct contact would seem counterproductive to the precise etching pattern HH seeks to achieve. Accordingly, the method of claim 38 is neither taught nor fairly suggested by HH and the rejection of claim 38 as obvious under 35 USC §1.3 must fall.

H. Claim 39

Aspects of claim 39 are analogous to aspects of claim 38 discussed immediately above. By analogy to the preceding discussion of claim 38, therefore, claim 39 is patentable over HH.

I. Claim 40

The method of claim 40 includes contacting a processing side of a microelectronic workpiece with an electrolytic solution; applying direct electrical current to a workpiece electrode and at least one of a first remote electrode and a second remote electrode; and applying an alternating current to the first and second remote electrodes while applying the direct current. The undersigned is unaware of anything in HH that would suggest applying both DC and AC in such a fashion. Unless the Examiner can either point out where HH suggests such a method or articulate why one skilled in the art would be motivated to modify HH to perform such a method, HH cannot render claim 40 obvious.

J. Claims 41 and 42

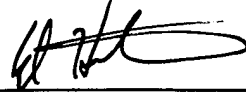
Aspects of claims 41 and 42 are analogous to aspects of claim 40. By analogy to the immediately preceding discussion of claim 40, therefore, claims 41 and 42 are patentable over HH.

In addition, claims 41 and 42 call for moving at least one of the microelectronic workpiece and/or the first and second remote electrodes relative to each other while applying the direct current and the alternating current so that the first and second remote electrodes have a higher dwell time at different regions of the workpiece. The Examiner apparently tries to address this aspect by speculating that “the reference appears to incorporate a ‘dwell time’ because there is apparent current control associated with a timer.” Such conjecture falls short of even a *prima facie* §103 rejection. Even if the Examiner were able to back up this conjecture with fact, the undersigned fails to see how merely switching on and off of a power supply could possible lead one to move the workpiece and/or remote electrodes while applying DC and AC to yield different dwell times at different regions of a workpiece. Accordingly, claims 41 and 42 are further distinguishable from and patentable over HH.

IV. Conclusion

In view of the foregoing, the claims pending in the application comply with the requirements of 35 U.S.C. § 112 and patentably define over the applied art. A Notice of Allowance is, therefore, respectfully requested. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-3848.

Respectfully submitted,
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